

must be applied. This varies, of course, for each fracture, but the guiding principle is the following: The splints are meant to retain the fractured ends of the bones in their proper position after they have been reduced and correctly fixed. They are not supposed to rectify an imperfectly-corrected displacement by either constantly forcing or pulling the bones into position. This is a very important point. If the fractured ends have been more or less satisfactorily interlocked, very little pressure is required to keep them in position, and consequently a splint may be put on so as to be comfortable to the patient without any special pressure being applied; that is to say, to keep the bones in line and prevent the displacement from mechanical causes rather than to keep them forcibly in apposition and violently oppose muscular contraction.

The question of massage in the after-treatment of fractures has been much discussed, and more or less general agreement has been come to. It is quite evident that the sooner movements and massage can be begun, the quicker will the function of the limb be restored so long as no displacement of the bones occurs during the manipulations. My own belief is that the fractured ends ought to be left quite still for eight or ten days after the injury, except in the case of fractures of the forearm where the fingers can be left out and moved from the first. By that time the bones will be more or less stuck together with fairly firm material, so that a certain amount of force would be necessary to displace them; and from that time onwards the splints may be taken off once or twice a day, and massage and careful active and passive movements of the neighbouring joints and muscles carried out so as to prevent the occurrence of stiffness. In most cases, provided the patient does not put any strain on the part, the splints may be left off entirely in from three to four weeks. I do not at all approve of treating fractures without any splints, or of looking on massage as a panacea of primary importance and reduction and retention as of quite minor value.

## FUNCTIONAL ALBUMINURIA IN ATHLETES.\*

By W. COLLIER, M.D., F.R.C.P.LOND.,

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My interest in the subject of functional albuminuria was aroused twenty years ago by a paper published by Dr. Pavy,<sup>1</sup> in which he insisted that a class of cases existed in which albumen was found in the urine at certain periods of the day under certain circumstances, and that this class of case should be carefully distinguished from the class of case which would fall within the category of albuminuria from Bright's disease. In order to prove his point Dr. Pavy cited several cases of young people, in which albumen appeared some hours after rising but never after rest. A few weeks later, influenced I have no doubt by the teaching of the late Sir George Johnson, whose clinical clerk I had been, I ventured to publish a case of intermittent albuminuria occurring in an undergraduate, which had been known to exist for some years, and urged that certain additional symptoms which were present pointed to slowly developing secondary changes in the kidneys. I argued that if Dr. Pavy would patiently watch his cases for some years, many, if not all, might develop all the usual symptoms of Bright's disease.

As time went on I found that at Oxford I had unusually good opportunities of studying at least one form of functional albuminuria. Each succeeding October brought up to Oxford between seven and eight hundred youths, fresh from the public schools, a large number of whom were anxious to engage in severe athletic competitions, and in order to satisfy the wishes of their parents, many of them sought medical advice to decide whether they were sound enough to undergo the strain. Of those who consulted me, I soon found, as the result of my examinations, I had to advise more men to avoid these competitions because of pronounced albuminuria than for any degree of weakness in either their hearts or lungs. For the past twenty years I have every term been examining men apparently in the very best of health, whose urine a short time after exercise will contain a very definite and in many cases a very large quantity of albumen, and after a night's rest all traces of it will have disappeared only to return again after exercise, and

the quantity thrown down will be approximately in proportion to the work done. I would here emphasize the fact that these men had never exhibited any of the symptoms which so often accompany the intermittent albuminuria of the schoolboy, and which have been so graphically described by Dr. Dukes, of Rugby, and Mr. Armstrong, of Wellington.

In the past my custom has been to advise such men to give up all competitions involving great muscular strain, such as rowing in races and running in athletic sports, and to be content with more moderate exercise afforded by golf, lawn tennis, etc. It seemed to me that the appearance of albumen after exercise was probably due to some defect in the walls of the renal blood vessels, and that by constantly throwing increased pressure on these walls the defect would almost certainly be increased. The knocking off an apparently healthy and vigorous young fellow from one or other form of athletic competition on which he had set his mind was, I thoroughly realized, often a very serious matter so far as he himself was concerned, and I frequently suggested that he should consult his parents and get a second opinion. My advice was often taken, and in this way I had the opportunity of learning the opinions of many of the leaders of the profession on the subject. I have at the present moment in my possession letters from a considerable number of consultants in London, living or dead. I may at once say that in every instance they endorsed my opinion and advised the patient to give up athletic competitions. I wish to emphasize this point. It is interesting because, as I hope to show, such advice was quite unnecessary and therefore wrong. I will quote a few of these opinions:—

In 1894 a London consultant writes: I agree entirely with you that your patient should not row. I should imagine that his vascular system is not strong enough to withstand the pressure of severe exertion.

Another writes in 1899: I have little doubt your observations agree with mine, that muscular exercise has a marked influence on the amount of albumen passed, and that therefore it would be advisable for him not to row, as it might aggravate his condition.

A third writes: I always try to make such patients lead quiet lives; I take it the albumen is an indication of renal incompetence, and therefore the patient should live down to his weak organs.

One of my patients, who was under the care of a very eminent specialist on renal diseases, was ordered to winter abroad for three consecutive years, without in the least affecting his condition. Another, who was anxious to enter for the Indian Civil Service, I sent to the physician (since dead) who I knew examined these candidates for the Government, and the opinion he expressed was so absolutely at variance with my own that I quote it:—

You remark on the very large number of undergraduates who suffer in this way. I have also been surprised by the very considerable number of candidates for the Civil Service who present intermittent albuminuria after their literary examination. I can hardly recall one case in which, after a little time and management, the affection has not passed away.

My experience is absolutely contrary to this physician's. My experience has been that if I have found albumen in my patient's first year of residence, it has continued throughout his university career, and then I lose sight of him. Nor have I seen any of the various lines of treatment suggested by London consultants in any way influence the deposition of albumen after exercise. For many years I kept my patients under observation for a considerable time and endeavoured to impress on them the necessity of leading quiet lives, free from great muscular exertion. I knew that a certain percentage of them ignored this advice and went in for hard rowing and running just as usual, without, apparently, being any the worse. In recent years I have become less strict.

When three years ago your Society announced a discussion on the subject of functional albuminuria I attended with the intention of speaking, but, like many others on that occasion, time brought the discussion to an end without giving us an opportunity. I was particularly anxious to learn in what light speakers would regard intermittent albuminuria from the point of view of insurance. Fortunately several of them expressed a definite opinion. Your then President, Dr. de Havilland Hall, closed his paper with these words: "I would say that the presence of albuminuria is sufficient ground for deferring the proposal." Dr. Samuel West's advice was to

\* Read before the Medical Society of London, December 10th, 1906.

reject all such lives above 40, to load heavily between 30 and 40, to make some addition to every case under 30, and to wait a while and watch the cases in adolescence and youth. Dr. Garrod argued that the question was so open that it would be very unwise to depart from the cautious attitude which insurance offices had taken up in the matter.

I must acknowledge that the opinions here expressed, with the exception of Dr. West, with which I am in partial agreement, did not commend themselves to me. As I pondered over the subject it seemed to me rather absurd that a man's future depended on whether his medical examination took place in the morning or afternoon. I knew that I could produce several young men at Oxford who, if they wished to insure themselves or enter for the Indian Civil Service, would be accepted as first-class lives if they were examined in the morning, and would fail in the afternoon, because after a certain amount of exercise their urine would show a definite amount of albumen. I had had cases of this sort of my own refused, and that, too, in spite of protest.

It had often occurred to me that, after all, one only had had the opportunity of examining a small percentage of the athletes at the University, and that it would be very interesting to make a systematic examination of the urines of a large number of men indulging in severe muscular exercise under precisely similar conditions.

Accordingly during last Easter term (February, 1906) I arranged, with the help of Mr. H. C. Lecky, who was at the time holding the appointment of House-Physician to the Radcliffe Infirmary, to examine the urine of the various college crews who were training for the Torpids. We agreed one of us should test the urines by the cold nitric acid test, while the other should subject a portion of the same sample of urine to the heat and acetic acid test. We arranged that the specimens should be passed from an hour to an hour and a half after rowing.

My previous experience with undergraduates led me to anticipate that we should find numerous cases of albuminuria, but I was quite unprepared for what we did find. In some cases the urine of every member of the crew contained albumen, and sometimes the urine of two or three, or even four, members would contain very heavy clouds of albumen; especially was this true of the head boats on the river. The better the crew, it seemed, the more cases of albuminuria, the probable explanation being the harder the work the heavier percentage of albumen.

We examined 156 men in training for the Torpids.

With the cold nitric acid test:

49 showed no trace,  
24 slight ring,  
54 definite ring,  
27 very thick ring.

That is, with this test 81 specimens out of 156 contained a very definite amount of albumen.

With the heat and acetic acid:

26 showed no trace,  
41 a faint trace,  
58 a definite cloud,  
31 a thick cloud;

89 out of 156 showed a very definite amount of albumen—57 per cent.

It must be remembered that in the case of many of these crews only a moderate amount of work had been done. On four or five occasions, when specimens were sent us by crews who had been rowing the course at racing pace, the number of those passing very definite amounts of albumen was strikingly increased.

Later on we examined the urines of the crews competing in the Inter-University Boat Race. From the Oxford crew we obtained specimens from the eight members of the crew one hour after rowing the full course from Putney to Mortlake, and in every instance albumen was present, in 50 per cent. in large quantities. We were only able to obtain specimens from three members of the Cambridge crew, but in each instance albumen was present.

I next attempted to get specimens from those who were to take part in the Inter-University Athletic Sports, but was far less successful. I was only able to examine about a dozen specimens; in not a single instance did I fail to find albumen after racing, and generally in considerable quantities.

I next sought the aid of the medical officers of some of our large public schools, asking them to examine the urines of some of their boys from  $\frac{1}{2}$  to  $1\frac{1}{2}$  hours after racing.

Dr. Whittingdale of Sherborne, the late Dr. Ferguson of Cheltenham, and Dr. Cronk of Repton were good enough to make a few observations for me, and of 38 specimens examined, 37 contained albumen.

I should like to compare these results with those obtained by Sir Grainger Stewart in 1888. Of 32 soldiers marching eight to ten miles in heavy marching order, he found after breakfast and before exercise 40 per cent., while before breakfast 15 per cent. showed albumen, and after the march only 28 per cent. Thus the exercise acted beneficially on the dietetic albuminuria. In one or two instances albumen was present only after marches. He next tested the effect of muscular exertion on 36 soldiers, who had to carry coal up steep inclines, and found that while 44 per cent. had albumen before the exercise, 64 per cent. had it at the end of their work. Of 25 schoolboys after an hour's football, 3 showed a trace with cold nitric acid and 12 with picric acid—60 per cent. altogether. In commenting on these cases, Sir Grainger says: "You will observe that this experiment confirms the view that it is only a slight albuminuria which is produced by violent exercise in healthy people."

I do not at all agree with these conclusions, as my investigations go to show that with the cold nitric acid test, a very much less sensitive test than the picric acid, 57 per cent. showed albumen, and 51 per cent. showed a very definite ring of albumen.

I am well aware that my observations are very incomplete; it would have been more satisfactory to have ascertained what percentage of the urines of my rowing friends were free from albumen in the early morning and contained a definite trace later in the day after ordinary exercise. My previous experience would lead me to feel certain that I should have found a very considerable number of such cases. I hope later on to have the opportunity of continuing my investigations on these lines.

Unfortunately the patients I have had in the past under prolonged observations, have at the end of three or four years left Oxford and I have neither seen nor heard more of them. In the few cases I have been able to follow in later life the albumen has permanently disappeared.

I would especially mention one patient who, on the advice of the late Sir George Johnson, spent a winter in Egypt and two at Biarritz, whose urine so far as I could observe was not in the slightest degree influenced by these precautions, for he passed just as much albumen after exercise when he left Oxford as when he came. In his case I have recently learnt that for quite ten years now his urine has been free from albumen after exercise.

Again we may learn something from the University crew. Here we have a picked body of men who have to pass a careful medical examination before their training commences, and yet we find that every member of the crew without exception passes albumen after a hard row, and at least half the crew a very considerable amount. Some years ago the late Dr. Morgan, of Manchester, made a thoroughly exhaustive inquiry into the after-health of men who had taken part in the Inter-University Boat Race since its commencement. His inquiry included some 294 competitors, and one of the conclusions arrived at was that the chances of long life in their case was distinctly greater than that of the average man. We have no reason to believe that University crews were any freer from athletic albuminuria in the past than in the present day.

In conclusion I wish to raise two points:

Ought one any longer to advise young men who pass large quantities of albumen after severe muscular exercise to give up all hard athletic competitions? I think not. These investigations would seem to prove that if so, we must discourage severe athletic competitions altogether. Of this year's Oxford University crew every member after rowing a trial over the full course passed a definite amount of albumen, and at least half the crew passed a very considerable quantity. With the College crews the same thing happened. In the New College boat, head of the river in the Torpids, after rowing a course every member's urine contained some, while in five of the crew the amount was large. The running men seemed to pass even more than the rowing men. In short, it would appear that just as we may expect to get evidence of hypertrophy of the left ventricle of the heart and emphysema of the lungs in the man who habitually indulges in violent athletic contests, so we may expect to find a definite amount of albumen in

his urine for a few hours after taking part in these exercises.

Finally, ought the assurance companies to continue to refuse to consider the acceptance of the lives of young men between the ages of say 18 and 30, whose urines are found to contain albumen after exercise when it can be shown that no albumen is present after rest or after a meal? I think not. I have known instances of men who have been absolutely refused because they happened to be examined in the afternoon after exercise, when they would certainly have been accepted had they been examined in the earlier part of the day. To me this seems a very unsatisfactory state of affairs.

I have already apologized for the incompleteness of my observations, but I am anxious to take an early opportunity to draw attention to a subject which seems to me one of great interest and which calls for a considerable amount of further investigation.

## REFERENCE.

*Lancet*, March 6th, 1886.

### AGE INCIDENCE OF GASTRIC ULCER IN THE MALE AND FEMALE.\*

By WILLIAM CALWELL, M.A., M.D.,  
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SEVERAL questions continually face us with regard to the etiology of gastric ulcer. Is the affection more common in the male or the female? What is the incidence of the affection in the sexes, especially in the adolescent female? Is there any new light as to the pathology? These problems of both clinical medicine and of pathology are rendered no easier by Dr. Hale White's "Gastrostaxis," in the address which appeared in the *Lancet* of November 3rd, despite its valuable suggestiveness and information.

Regarding the age incidence in the female, there is one fact of importance—namely, the sudden and profuse

haemorrhage which occasionally attacks the adolescent female who has made little or no complaint of stomach trouble; it is quite possible that this blood may come from an oozing; but in other cases it has been clearly demonstrated that it is from an ulcerated blood vessel. In one of my own cases, which proved fatal, a perfectly fresh ulcer of the stomach, not larger than a sixpence, was found, but found only when the stomach was stretched out; a large blood vessel was lying across the ulcer, and in it a hole the size of a large pin head; when the walls of the stomach were allowed to fall together again, and lie in the natural folds, the ulcer was not visible; if a careful examination had not been made, it would not have been discovered, and it would most probably have escaped detection at an exploratory operation.

It is very credible that such ulcers both form and heal with great rapidity; clinical histories would make one believe that they may break down in a few hours, and we have operative evidence to prove that wounds in the stomach heal with no greater delay. A healing ulcer is but a wound. We can easily understand that such an ulcer, if once the pathological action had come to an end, and if kept at rest with the edges lying in apposition, might heal in a few days, perhaps in twenty-four hours. In passing, it may be observed that the *post-mortem* appearance of this case supports the view lately put forward that in cases of haematemesis repeated bleeding

may be brought about by alternating distension and contraction of the stomach, and that attention is to be paid to the extent of gastric resonance, and frequent sippings of a mild carminative tried as a treatment.

Such cases are not rare, although a fatal termination is rare; but there is still the much larger class of case, which resemble this case in their often slight, evanescent dyspepsia and in their chlorotic condition, but do not complete the picture by an attack of haematemesis; they are mostly classified as "tea," "anaemic," or "neurotic dyspeptics." The simplest explanation seems to be that many of these cases are really cases of ulcers, and that the accident of haematemesis depends on whether the ulcer is situated on a vessel or not, and the accident of perforation, which also occurs unexpectedly, on the depth of the ulcer. In such acute cases where, as happens in the very large majority, no complication occurs, recovery is rapid with rest and a little starvation. Each time, however, these attacks recur, the symptoms of chronic ulcer become more apparent. Nearly every one of these female patients is chlorotic, and if we pursue our investigations, nearly every chlorotic, in marked contradistinction to the adolescent male, has, or has had, some stomach trouble.

Three years ago I tabulated the age at which symptoms commenced in 200 cases, comprising instances both of undoubted gastric ulcer and of these cases in which the symptoms were the symptoms of gastric ulcer without the haematemesis. I then reduced Byrom Bramwell's chart of 314 cases of chlorosis to the proportion of my numbers, and superimposed it on my chart.

A study of this chart shows at once the enormous rise of ulcer in the female during the age of adolescence, and that this rise exactly corresponds with that of chlorosis. Further, chlorosis is absent in the male, and this type of stomach trouble is extremely rare in the male. Again, after the age of 25 to 30, the onset of ulcer is about equal in both male and female. If any one objects that these cases are not ulcers, I shall simply vary the name, and

say, "the age incidence of ulcer and of ulcer-like dyspepsia."

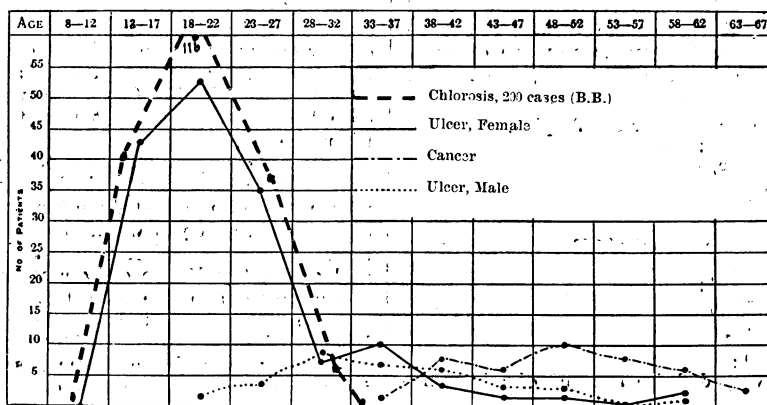
There is presumptive evidence that if we exclude all cases of ordinary gastric catarrh, of dyspepsia from irritant food, and of dyspepsia of neurotic origin, we have still a large number of cases of "dyspepsia" in the adolescent female which are really due to ulcer; that these ulcers rapidly form and probably as rapidly heal.

and that it is only by the accident of haemorrhage or of perforation, or of repeated relapses leading to chronicity that we recognize their real nature; and, lastly, that there are apparently two kinds of ulcer—one connected in some mysterious way with chlorosis and frequently with amenorrhoea, probably being a developmental disease; and the other being a type which occurs pretty equally in both male and female, and is not often seen till after 20.

The importance of this in treatment is paramount. Cases of "dyspepsia" in the adolescent chlorotic female are to be treated as ulcers; and, further, cases of chlorosis, with or without stomach symptoms, are to be looked upon as potential cases of ulcer, and so of haemorrhage and of perforation.

Of a large number of cases which ultimately came into the surgeon's hands, not one, as far as the history went, received full treatment of both ulcer and chlorosis—that is, the due preventive treatment of adhesions, hour-glass stomach, chronic ulcer, perforation, etc.

Chart showing Ages of Onset of Ulcer of Stomach in Male and Female in 200 Cases.



\* Excerpt from a clinical lecture.